

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 57

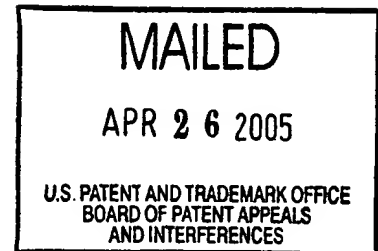
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RICHARD M. WEBER
and KERRIN A. RUMMEL

Appeal No. 2004-1248
Application No. 08/675,280

ON BRIEF



Before FRANKFORT, MCQUADE, and BAHR, Administrative Patent Judges.

MCQUADE, Administrative Patent Judge.

DECISION ON APPEAL

Richard M. Weber et al. appeal from the final rejection (Paper No. 45) of claims 1, 2, 7, 8, 17 through 22, 25 through 28, 30 and 31. Claim 29, the only other claim pending in the application, stands withdrawn from consideration as being drawn to a non-elected species.

This is the second appeal to this Board involving the instant application. The decision (Paper No. 26) in the first appeal (Appeal No. 1998-1605) has no apparent bearing on the issues raised in the current appeal.

THE INVENTION

The invention relates to "heat sinks wherein heat is absorbed by the phase change of a phase change material" (specification, page 1). Representative claims 1 and 25 read as follows:

1. An apparatus comprising a heat sink which in its entirety can absorb heat over time, said heat sink including:

(a) an enclosure defining an enclosed cavity and having a highly thermally conductive portion composed of a composite of highly thermally conductive fibers disposed in a matrix;

(b) a plurality of said fibers extending externally of said matrix and into said cavity to provide a porous, highly thermally conductive material integral with and thermally coupled to said highly thermally conductive portion and disposed in said cavity, said porous material being said plurality of said thermally conductive fibers extending from said matrix into said cavity, and

c) a phase change material disposed in said porous material in said cavity, said phase change material being operable in its entirety to absorb heat over time, and said phase change material changing from an initial phase to a final phase in response to the absorption of heat.

25. An apparatus comprising a heat sink which in its entirety is operable to effect over a period of time a net absorption of heat from externally thereof, said heat sink including:

an enclosure having a cavity therein, said enclosure having a highly thermally conductive portion;

a highly thermally conductive porous material disposed within said cavity and coupled physically and thermally to said highly thermally conductive portion of said enclosure, said porous material having voids therein; and

a phase change material provided within said cavity so as to be disposed within and substantially fill said voids in said porous material, said phase change material being operable in its entirety over a period of time to effect a net absorption of heat introduced therein through said highly conductive portion and

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said porous material, said phase change material changing in its entirety from a solid phase to a liquid phase in response to said absorption of heat by said phase change material.

THE PRIOR ART

The references relied on by the examiner to support the final rejection are:

Telkes	2,677,367	May 04, 1954
Alspaugh	4,341,262	Jul. 27, 1982
Hayes	4,446,916	May 08, 1984
Voorhes et al. (Voorhes)	5,390,734	Feb. 21, 1995

THE REJECTIONS

Claims 26 and 31 stand rejected under 35 U.S.C. § 112, first paragraph, as being based on a specification which fails to comply with the written description requirement with respect to the subject matter claimed.

Claims 25 through 27, 30 and 31 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Telkes.

Claims 1, 2, 7, 8, 17 through 22 and 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Telkes in view of Voorhes.

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Claims 21 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Telkes in view of Voorhes and either Hayes or Alspaugh.

Attention is directed to the main and reply briefs (Paper Nos. 46 and 51) and answer (Paper No. 49) for the respective positions of the appellants and examiner regarding the merits of these rejections.

DISCUSSION

I. Preliminary matters

On pages 2 and 3 in the reply brief, the appellants refer to (1) a "pending" petition (Paper No. 50) objecting to an alleged new ground of rejection in the answer and (2) an alleged typographical error in the answer involving the inclusion of claims 21 and 22 in the statement of the § 103(a) rejection based on Telkes in view of Voorhes. Suffice to say, the record contains a decision (Paper No. 52) dismissing the petition, and the discussion of "the specifically claimed phase change material" (answer, page 5) in the explanation of the subject § 103(a) rejection demonstrates that the inclusion of claims 21 and 22 therein was intended.

II. The 35 U.S.C. § 112, first paragraph (written description),
rejection of claims 26 and 31

The test for determining compliance with the written description requirement of 35 U.S.C. § 112, first paragraph, is whether the disclosure of the application as originally filed reasonably conveys to the artisan that the inventors had possession at that time of the later claimed subject matter, rather than the presence or absence of literal support in the specification for the claim language. In re Kaslow, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983).

Claims 26 and 31 depend from independent claims 25 and 30, respectively, and recite that the phase change material in the cavity of the enclosure is free of substantial movement within the cavity. Although this recitation lacks literal support in the original disclosure, the examiner (see page 6 in the answer) in essence allows that it has inherent support in the original disclosure of the heat sink embodiment shown in Figure 1 by virtue of the statement on page 7 in the specification that the PCM (phase change material) 7 is poured into the voids of the porous material 1 and partially or "fully" fills the remainder of the cavity. According to the examiner, however,

the examined [i.e., appealed] claims do not read on the embodiment of Figure 1 since this non-elected species

is abandoned per the [earlier] Board of Appeals Decision. Only [with respect to] the non-elected embodiment (i.e. Figure 1) on page 7 of applicants['] originally filed specification does it state that the PCM 7 partially or fully fills the remainder of the cavity. Nowhere in the originally filed specification does it state that the elected embodiments' (i.e. Figure 2) cavity can be fully filled with the PCM 27 [answer, page 6].

The examiner's analysis here is unsound. To begin with, the examiner has failed to advance any factual or legal support for the manifestly suspect assertion that the heat sink embodiment shown in Figure 1 is abandoned by virtue of the earlier decision of this Board. Claims 26 and 31 do in fact read on the heat sink embodiment shown in Figure 1. Thus, the examiner's implicit concession that the original disclosure of this embodiment provides written descriptive support for the subject matter recited in these claims belies the basis for the rejection. Moreover, claims 26 and 31 also read on the heat sink embodiment shown in Figure 2. In describing this embodiment, the original disclosure states that "[t]he PCM material 15 is then entered into the cavity as in the first embodiment" (specification, page 7). One of ordinary skill in the art would have appreciated this statement as meaning that the PCM material 15 partially or "fully" fills the cavity as in the first embodiment. Therefore, even if claims 26 and 31 were limited to the heat sink embodiment

shown in Figure 2, the original disclosure would still provide written descriptive support therefor.

Hence, the disclosure of the application as originally filed would reasonably convey to the artisan that the appellants had possession at that time of the subject matter now recited in claims 26 and 31. Accordingly, we shall not sustain the standing 35 U.S.C. § 112, first paragraph (written description), rejection of these claims.

III. The 35 U.S.C. § 102(b) rejection of claims 25 through 27, 30 and 31 as being anticipated by Telkes

Anticipation is established only when a single prior art reference discloses, expressly or under principles of inherency, each and every element of a claimed invention. RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984). In other words, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. Scripps Clinic & Research Found. v. Genentech Inc., 927 F.2d 1565, 1576, 18 USPQ2d 1001, 1010 (Fed. Cir. 1991).

Telkes discloses radiant energy heat storage devices which are particularly useful in solar heating applications. For purposes of the rejection, the examiner focuses on the embodiment

illustrated in Figure 4. This embodiment comprises a container 10 made of a suitable heat-conductive material such as metal or glass, a cover 12 for sealing the container, a matrix 14' of calcium-containing glass wool disposed within the container, and a heat storing solution of disodium orthophosphate and water filling the remainder of the container. The disodium orthophosphate is valuable as a heat storing medium as it "possesses a very high heat of fusion at a temperature which makes it available for space heating purposes" (column 1, lines 25 through 27). The purpose of the glass wool matrix is to control the crystallization of the disodium orthophosphate so as to allow heat to be efficiently extracted therefrom (see column 1, line 42, through column 2, line 25). In order to perform this function, the matrix must maintain contact with the upper part of the solution (see column 2, lines 26 through 33). To this end, Telkes teaches that the glass wool matrix "extends substantially throughout the interior of the container 10, so that it will not settle to the bottom. Except for the interstices between the glass wool filaments, the glass fills the container" (column 4, lines 44 through 48).

As framed and argued by the appellant, the dispositive issue with respect to this rejection is whether Telkes meets the

limitation in independent claim 25, and the corresponding limitation in independent claim 30, requiring the highly thermally conductive porous material disposed within the cavity to be "coupled physically" to the highly thermally conductive portion of the enclosure. The examiner considers that Telkes' glass wool matrix 14 constitutes such a highly thermally conductive porous material which is coupled physically to a highly thermally conductive portion of enclosure/container 10. In the examiner's view, "if the matrix touches the container wall it meets the limitation of physically coupled within the claims" (answer, page 7). The mere contact disclosed by Telkes between matrix 14 and container 10, however, does not make these elements "coupled physically" under any reasonable definition of this term,¹ especially when such is read, as it is required to be, in light of the underlying specification.² Thus, the examiner's

¹The appellants have advanced a dictionary definition of the term "coupled" as meaning "To link together; connect" (reply brief, page 7). This definition is representative of the ordinary and accustomed meaning of the term within the context disclosed and claimed by the appellants.

²The examiner's gratuitous observation (see page 7 in the answer) that the appellants' disclosure does not teach a physical coupling of the type recited in claims 25 and 30 is inaccurate. The specification expressly states with respect to the Figure 1 embodiment that "porous aluminum medium 1 is vacuum brazed to an aluminum plate 3" (page 7) and with respect to the Figure 2

determination that Telkes is anticipatory with respect to the subject matter recited in claims 25 and 30 is not well taken.

Consequently, we shall not sustain the standing 35 U.S.C. § 102(b) rejection of independent claims 25 and 30, and dependent claims 26, 27 and 31 as being anticipated by Telkes.

IV. The 35 U.S.C. § 103(a) rejection of claims 1, 2, 7, 8, 17 through 22 and 28 as being unpatentable over Telkes in view of Voorhes

As acknowledged by the examiner (see page 4 in the answer), Telkes does not respond to the limitations in independent claim 1 and dependent claim 28 (which depends from independent claim 25) requiring the highly conductive portion of the enclosure to be composed of a composite of highly thermally conductive fibers disposed in a matrix. It follows that Telkes also fails to respond to the limitations in these claims calling for the fibers to extend from the matrix into the cavity to provide the porous, highly thermally conductive material. To cure these shortcomings, the examiner turns to Voorhes.

Voorhes discloses a heat sink "having a bundle of thermally conductive [e.g., graphite] fibers that extend from a heat

embodiment that "composite fibers 13 from the plate 11 without matrix attached extend from the plate into the PCM cavity" (page 7).

receiving end to a heat dissipating end where they are splayed as extremely numerous fins of one or plural coalesced fibers to enlarge the effective heat convecting area" (Abstract). Figure 11d depicts a bundle of such fibers with their fin ends 74 held in spaced relationship by embedment in an adhesive plate 75.

In proposing to combine Telkes and Voorhes to reject claims 1 and 28, the examiner submits that

Voorhes et al., in at least Figure 11d, discloses that it is known to have a wall including a composite of highly thermally conductive graphite fibers disposed in a matrix for the purpose of increasing the thermal conductivity of the wall. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Telkes a portion of the enclosure/wall including a composite of highly thermally conductive graphite fibers disposed in a matrix for the purpose of increasing the thermal conductivity of the wall as disclosed in Voorhes et al. [answer, pages 4 and 5].

Telkes and Voorhes pertain to devices which differ markedly in both structure and function. The examiner's apparent attempt to bridge this gap by characterizing Voorhes' Figure 11d as showing a wall having highly thermally conductive graphite fibers disposed in a matrix "for the purpose of increasing the thermal conductivity of the wall" misstates the actual teachings of the reference. Simply put, the only suggestion to combine the disparate devices disclosed by Telkes and Voorhes in the manner

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proposed by the examiner stems from hindsight knowledge impermissibly derived from the appellants' own disclosure.

Accordingly, we shall not sustain the standing 35 U.S.C. § 103(a) rejection of claims 1 and 28, and claims 2, 7, 8, 17 through 22 which depend either directly or indirectly from claim 1, as being unpatentable over Telkes in view of Voorhes.

V. The 35 U.S.C. § 103(a) rejection of claims 21 and 22 as being unpatentable over Telkes in view of Voorhes and either Hayes or Alspaugh

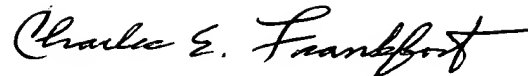
As the examiner's application of either Hayes or Alspaugh fails to overcome the above noted deficiencies of Telkes and Voorhes relative to the subject matter recited in parent claim 1, we shall not sustain the standing 35 U.S.C. § 103(a) rejection of dependent claims 21 and 22 as being unpatentable over Telkes in view of Voorhes and either Hayes or Alspaugh.

SUMMARY

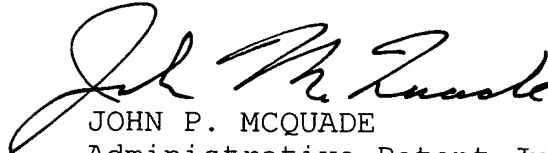
The decision of the examiner to reject claims 1, 2, 7, 8, 17 through 22, 25 through 28, 30 and 31 is reversed.

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REVERSED



CHARLES E. FRANKFORT
Administrative Patent Judge



JOHN P. MCQUADE
Administrative Patent Judge



JENNIFER D. BAHR
Administrative Patent Judge

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